HIGHLIGHTS OF 1989 MINERAL INVESTIGATIONS IN THE WESTERN BROOKS RANGE, NORTHWESTERN ALASKA

By Jeffrey Y. Foley

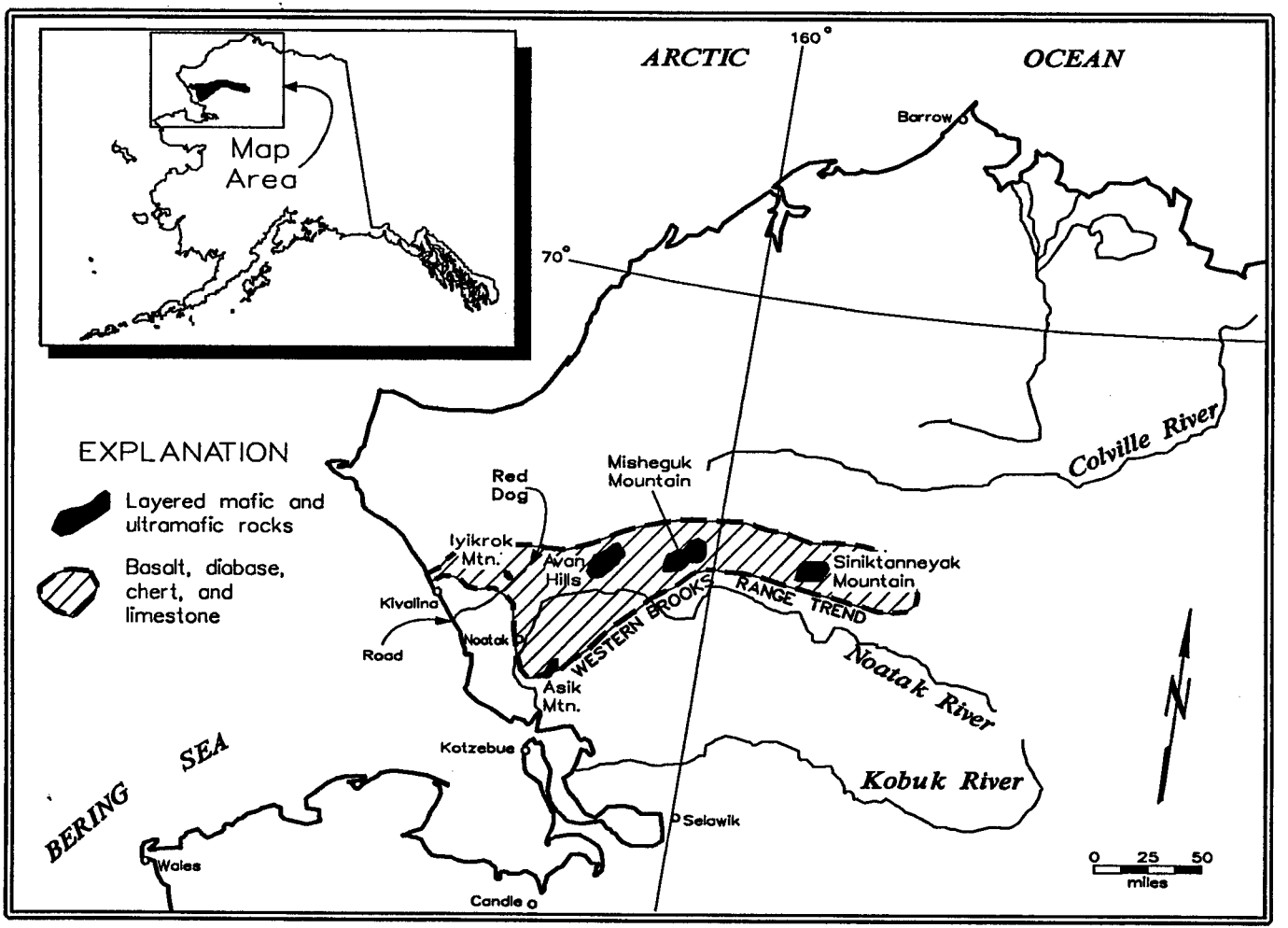
********** July 6, 1989

UNITED STATES DEPARTMENT OF THE INTERIOR

Manuel J. Lujan, Secretary

BUREAU OF MINES

T S Ary, Director


Map Area
ARCTIC
OCEAN
160°
70°
Barrow
Colville River
EXPLANATION
Layered mafic and ultramafic rocks
Basalt, diabase, chert, and limestone
Red Dog
Misheguk Mountain
Iyikrok Mtn.
Avan Hills
Siniktanneyak Mountain
BROOKS RANGE TREND
WESTERN
Kivalina
Noatak
Road
Asik Mtn.
Noatak River
Kotzebue
Kobuk River
BERING SEA
Selawik
Wales
Candle
0 25 50
miles

Five chromite deposits were discovered during recent strategic and critical mineral investigations conducted jointly by the Bureau of Mines, the U.S. Geological Survey, and the Alaska Division of Geological and Geophysical Surveys. The chromite deposits are all in the Avan Hills ophiolite mass in the Delong Mountains, western Brooks Range where the Bureau had previously discovered and described 59 other chromite occurrences and deposits. Additional chromite deposits were also previously located by the Bureau at Iyikrok Mountain and Misheguk Mountain, also in the Delong Mountains, western Brooks Range (BuMines IC 9087 & OFR 97-85).

Depending on the actual deposit grade and subsurface extent, the largest of the recently discovered chromite deposits may contain as much as 1.5 million short tons of chromite. This would make the deposit approximately equal in size to the Turner Stringer Zone, at Red Mountain on Kenai Peninsula, where 1.25 million short tons of chromic oxide (Cr_2O_3) have been identified (IC 8990-1).

The other four, recently discovered chromite deposits in the Avan Hills, are estimated to contain from 100 to 72,000 short tons of chromic oxide, and combined with the larger chromite deposit, between ~~220~~ 151 thousand and 1.6 million short tons of contained chromic oxide were discovered during the recent investigation. Combined with chromite deposits previously identified by the Bureau, the western Brooks Range ophiolite, together are estimated to contain between 72,000 and 2.5 million short tons of chromic oxide.

The above estimates assume that the chromite deposits are lens-shaped, as has been demonstrated to be the case for most chromite deposits in alpine peridotites. Tonnages were calculated for deposits with thickness equal to one quarter deposit length, and for deposits with thickness equal to one half deposit length. Therefore a minimum and maximum deposit size were calculated. In cases where deposits are open on one and due to snow or

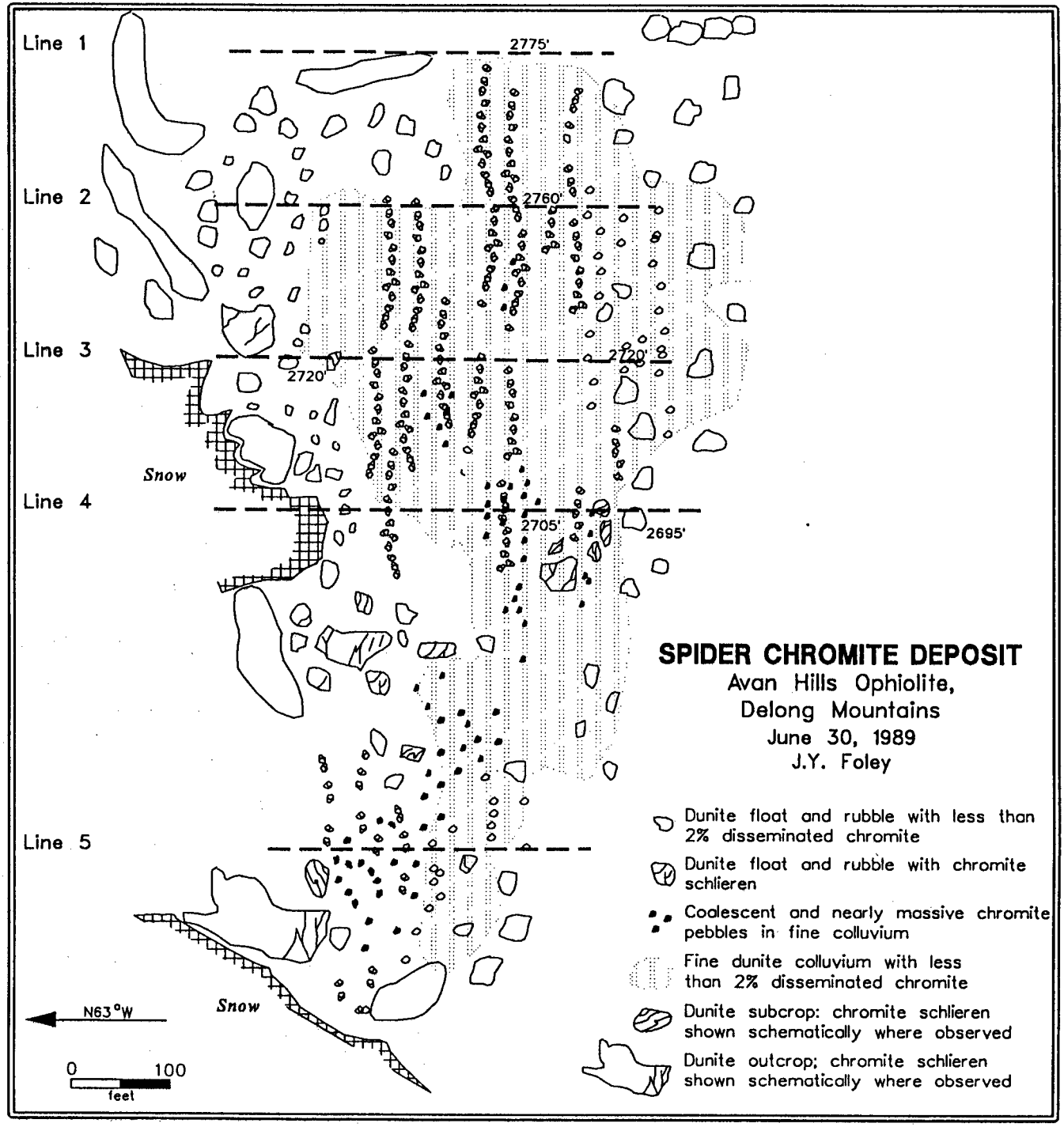
colluvial cover, the deposit length was multiplied by 1.25 for maximum deposit size calculation.

A tape and Brunton map of the Spider chromite deposit, the largest in the western Brooks Range, is included with this report. A sketch map of Harris's PGM-Cr occurrence, which contains material with up to 0.27 oz/st PGM is also included. The location of the five chromite deposits mentioned above, and the location of Harris's PGM-Cr occurrence are shown on the attached USGS 1:250,000 scale Delong Mountain and Misheguk Mountain topo sheets.

The Spider chromite deposit is exposed in outcrop, subcrop, rubble, and float. The deposit is between 2660- and 2775-ft elevations and trends Northeast across a smooth, north-striking dunite ridge. At the time of discovery the deposit was covered with snow at its south end. The chromite content of the deposit is estimated to be between 5 and 10 pct, and may actually be richer. Chromite schlieren, which are elongated, and folded magmatic segregations up to several feet long and several inches wide are abundant within the 100- to 200-ft-wide by 1060-ft-long area shown on the tape and Brunton map. The schlieren variably contain segregations of disseminated, coalescent, and nearly massive chromite. Rubble and float blocks along the ridge are alligned in linear trains, separated by parallel trains of fine colluvium. These striated soil patterns result from concentration of surface waters in fine-grained material during annual freeze-thaw cycles. Five continuous grab samples were collected along survey lines 1-5 as shown on the map. The samples were collected for table concentration and mineral characterization by SLRC and ALRC.

During previous chromium investigations treatment of chromite samples in this way has resulted in the identification of several PGM occurrences in western Brooks Range and elsewhere in Alaska, .

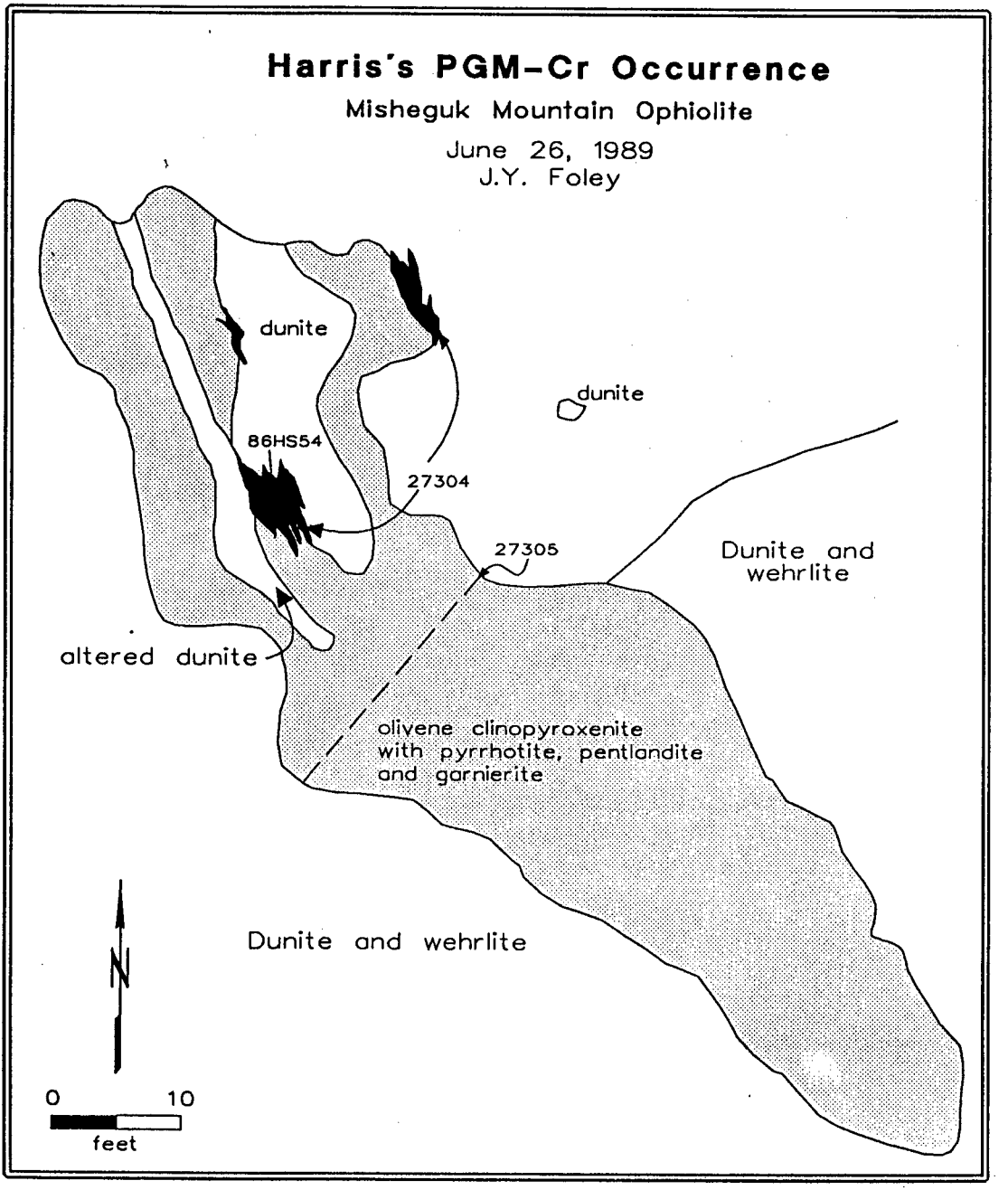
During the recent investigations, the PGM-Cr occurrences sampled by R.A. Harris in 1986 at Misheguk Mountain was examined. The attached sketch map


Line 1
2775'
Line 2
2760'
Line 3
2720'
2720'
Snow
Line 4
2705'
2695'
Line 5
Snow
N63°W
0
100
feet
SPIDER CHROMITE DEPOSIT
Avan Hills Ophiolite,
Delong Mountains
June 30, 1989
J.Y. Foley
Dunite float and rubble with less than 2% disseminated chromite
Dunite float and rubble with chromite schlieren
Coalescent and nearly massive chromite pebbles in fine colluvium
Fine dunite colluvium with less than 2% disseminated chromite
Dunite subcrop; chromite schlieren shown schematically where observed
Dunite outcrop; chromite schlieren shown schematically where observed

of that occurrence was constructed and additional samples were collected. Immediately prior to this years field work, a mineral characterization report was received from ALRC. That report confirmed the presence of sperrylite* ($PtAs_2$) in the high-iron chromian spinel from near Harris's occurrence. Note that the extraordinarilly high PGM values, associated with clinopyroxenite in dunite are similar to values obtained in similar rocks at Dust Mountain in the Border Ranges Complex, south central Alaska. Together, these occurrences indicate that a previously unknown environment for PGM exists and deserves further work.

Because the areas described herein are within the Noatak National Preserve, administered by the National Park Service, and are closed to Mineral Entry, it is recommended that no press release be issued pertaining to these discoveries. Unlike our attempts to visit these sites in 1988, this years investigations were conducted without incident, and a productive, cooperative relationship was established and maintained with the NPS. A press release might have the adverse effect of soliciting unwanted response from various conservation and preservation groups, thereby interfering with any future mineral investigations in the Noatak National Preserve.

* WB25750 collected in 1987 from ridge to west of Harris's occurrence.


Harris's PGM-Cr Occurrence
Misheguk Mountain Ophiolite
June 26, 1989
J.Y. Foley
dunite
dunite
86HS54
27304
27305
Dunite and wehrlite
altered dunite
olivene clinopyroxenite with pyrrhotite, pentlandite and garnierite
Dunite and wehrlite
N
0
10
feet

Deposit Tonnage Estimates

Spider Chromite Deposit:

Low estimate	High estimate
1060 feet long	1060 '
× 150 feet wide (average)	× 150 '
× 250 feet thick (deep) (i.e. .25 × Length)	* × 500 ' (i.e. .5 × length)
39,750,000 ft^3	79,500,000 ft^3
÷ 9.7 ft^3/st	÷ 9.7
4,097,938 st	8,195,876 st
× .05 (pct chromite)	× .10 (10 pct chromite)
204,897 st chromite	819,588 st chromite
× .65 ($\frac{Cr_2O_3}{chromite}$ = .65)	× .65
133,183 st Cr_2O_3	532,732 st Cr_2O_3

* Deposit is open on south end, therefore:

1060 × 1.25 = 1325 feet long
× 150 " wide
× 750 " thick (.5 × length)
14,906,000 ft^3
÷ 9.7 ft^3/to-
1,490,625 st chromite
× .65
968,906 st Cr_2O_3

Max at 10 pct chromite.

Harris #1, 89HS137 = WB27343

Low

2m (x 3.281 ft/m)
= 6.56 ft wide
x 82 ft long
x 20 ft thick (.25 x Length)
11,296 ft³
÷ 9.7 ft³/ton
1164 st
x .08 (8 pct chromite)
93 st chromite
x .65
60 st Cr_2O_3

High

123 ft x
x 6.6 ft
x 61 ft (.5 x length)
49520 ft³
÷ 9.7
5105 st
x .10 (10 pct chromite)
510.5 st chromite
x .65
332 st Cr_2O_3

Harris #2, 89HS138 = WB27341

Low

350 ft long
50 ft wide
87.5 ft thick
1,531,250 ft³
÷ 9.7
157,861 st
x .10
15,786 st chromite
x .65
10,260 st Cr_2O_3

High

437.5 ft long
x 75 ft wide
218.75
7,177,625 ft³
÷ 9.7
739,961 st
x .15
110,994 st chromite
x .65
72,146 st Cr_2O_3

Toni #1, 89TL143

trends N 30°W, dips 45°NE
5-10 pct chromite

Low

300 L
100 W
75 T
2,250,000 ft³
÷ 9.7
231,959 st
x .05
11,598 st chromite
x .65
7,539 st

High

300 L
100 W
150 T
4,500,000 ft³
÷ 9.7
463,918 st
x .10
46,392 st chromite
x .65
30,155 st Cr_2O_3

Toni #2

50 x 50
x 25 deep (thick)
62,500 ft³
÷ 9.7
6443 st
x .05
322 st chromite
@ 12.5 ft thick,
105 st Cr_2O_3

50 x 50 x 25
= 62,500 ft³
÷ 9.7
6443 st
x .10
644 st chromite
x .65
418 st Cr_2O_3